SHARED CONTROL OF NATURAL RESOURCES (SCOR)

INTEGRATING ENVIRONMENTAL AND CONSERVATION CONCERNS WITH PRODUCTION GOALS

A Participatory Approach to Land and Water Resources Management in a Watershed Context

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SCOR seeks to increase the users' share of control of natural resources in selected watersheds through partnerships between the state and users that contribute to greater production while conserving the natural resources base. SCOR will promote integrated planning for the use of land and water resources in two pilot watersheds with spread effects to other areas. The SCOR project is a collaborative effort of the Government of Sri Lanka, the United States Agency for International Development (USAID) and the IIMI.

INTEGRATING ENVIRONMENTAL AND CONSERVATION CONCERNS WITH PRODUCTION GOALS

- A Participatory Approach to Land and Water Resources Management in a Watershed Context[1] -

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1. INTRODUCTION

This paper will briefly examine the conceptual framework and implementation strategies of a participatory action-research project namely, the Shared Control of Natural Resources (SCOR) Project. **SCOR is aimed at integrating environmental and conservation concerns with production goals.** In order to achieve this goal the project adopts a novel **participatory approach to land and water resources management in a watershed context.** SCOR is being implemented by the International Irrigation Management Institute, IIMI, in collaboration with the Government of Sri Lanka. The project is funded by the United States Agency for International Development, USAID.

In Sri Lanka, like in many other developing countries, there is an urgent need for more intensive, but environmentally appropriate utilization of its natural resources base, particularly land and water resources, for profitable and sustainable agricultural and related industrial production. There is an increasing body of evidence from Sri Lanka and other countries in the region that farmers, even those with very small holdings make production responses to the economic environment within which they carry out their farming activities. **These responses are influenced by the degree of control the users can exercise over their means of production, availability of information about market conditions and opportunities and the necessary supporting services.** For example, enhanced group action by the users and participatory management of irrigation have resulted in significant increases in water use efficiency and crop yields in many irrigation systems. Increasing the user's share of control over natural resources through group action and their active participation in making management decisions are, therefore, widely recognized to be vital pre-requisites to improve management of these resources. Interventions aimed at improving natural resources management through local control are known to yield high rates of return.

Moreover, SCOR design team hypothesized that the natural resources base, particularly land and water, can be conserved and their productivity could be sustained if environmental and conservation concerns are incorporated into the production process of the users. SCOR concepts

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[1] Paper presented to the 8th International Soil Conservation Conference on "Soil and Water Conservation: Challenges and Opportunities", December 4-8, 1994, New Delhi, India.

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and strategies were developed through a unique participatory project design process spearheaded by a core group of experts including senior government officials who are closely associated with the management of land and water resources of Sri Lanka. The process was designed and facilitated by IIMI and financed by the USAID. The three-month design process included a review of past experiences in the management of natural resources in Sri Lanka and elsewhere, a series of consultations with a cross section of resources users, government officials at various levels, development banks and representatives of Non-Governmental Organizations (NGO).

The SCOR design is built on the progress already made in Sri Lanka and elsewhere in participatory irrigation management and social forestry. It applies an organizational approach coupled with appropriate technologies for integrated land and water resources management on a watershed basis. The appropriateness of the approach is being tested and demonstrated in two pilot watersheds of Sri Lanka (namely Huruluwewa in the North Central Province and Nilwala in the Southern Province) chosen for their differing social, agricultural and environmental characteristics. In these pilot areas, appropriate **production and conservation techniques and technologies are being used to augment and sustain the resource base and its productivity through participatory processes and novel modes of tenurial arrangements and state-user partnerships.**

The paper is organized in four parts: following this introductory section, part 2 of the paper will outline the constraints (as identified by SCOR design and implementation teams) to sustainable increases in productivity in the watersheds. Part 3 will examine the key elements of SCOR approach and part 4 will outline the SCOR implementation process.

2. CONSTRAINTS TO SUSTAINABLE INCREASES IN PRODUCTIVITY IN THE WATERSHEDS

A participatory analysis of constraints to and potential for sustainable increases in productivity in the watersheds had paved the way to SCOR design. Four types of major constraints have been identified in relation to the environmentally appropriate increase in production:

a) The lack of a **production environment** that motivates the resources user to effectively manage the combination of resources essential to maximize economic production;

b) The lack of an effective combination of education, incentives and mechanisms to enforce penalties that encourage internalization of environmental considerations into management decisions;

c) The lack of adequate information about the land and water resources management, at appropriate levels.

d) Institutional constraints including inadequate co-ordination between projects/activities of land and water resources development.

2.1 An Inappropriate Production Environment

Sri Lankan farmers' response to economic incentives and disincentives is clear, as evidenced by the change in farmer cropping practices, in Mahaweli System H and certain other areas taking comparative advantages from dry season rice planting on well-drained red-brown soils to the production of chili, when the Government policy of importing chili to maintain a low consumer price was modified to permit a greater profit to domestic producers. In these soils, the shift to the more suitable other field crops (OFCs), has resulted in a much more efficient use of the valuable irrigation water, as well as an improved fertilizer efficiency. The latter has also undoubtedly, resulted in substantially reduced leaching of nitrates to the groundwater, providing an important environmental benefit.

However, it is also clear that in many countries there are disincentives associated with a number of practices designed for environmental protection. In some cases the disincentives are economic while in others they are institutional. For example, when physical works such as terraces and protected waterways, or tree planting are required, the time necessary to recover the costs usually is too long for the resources user to bear. The customary way to reduce this economic disincentive is to pay some or all of the cost incurred in following this practice.

Another factor essential to sustainable production is sufficient security of tenure for farmers to utilize specific areas of land over an extended period. This reduces the temptation for exploitative land use, and permits recovery of investment in production and environment protection practices that takes relatively long cost-recovery periods. Security of tenure is usually assured by ownership title, but other mechanisms are available to provide effective security. Settlement schemes offer de facto security, as do various types of traditional tenancy. (See section 3.3)

However, the security of tenure alone is not sufficient to ensure that farmers will make economically and environmentally sound decisions. The size of the operating holding should permit viable and sustainable production. While there is evidence that there are individual small holdings which are or could be made economically viable, very small fragmented holdings are, generally, not conducive to either optimization of agricultural practices or to the application of environmental protection practices. Large operating holdings could permit a reasonable degree of optimization in the use of the available natural and human resources. However, the resources of individual holdings could be pooled together to bring about the same advantages without changes in tenurial rights.

There must be a supportive production environment. Production inputs, such as credit, seeds, fertilizer and technical information must be available at reasonable effort and cost. The total costs to farmers, particularly small holders, often include a high proportion of "transaction costs", those monetary and non-monetary payments that are associated with obtaining necessary

approvals, ensuring timely availability of inputs, etc. These costs frequently result in decisions significantly different from those that would result if they did not constitute a factor.

Some of these input constraints may be reduced through organized group action. This is important in respect of two aspects, (1) the impact on the ability to organize for group economic activity and (2) the availability of supporting services. Small landholders and other individual resources users experience significant difficulties when they attempt to expand and/or modify their economic activities. Even when they have reasonable security of tenure, they find it difficult to obtain adequate financing, to gain from economies of scale, and to benefit from available professional services. Under such circumstances, organizing into groups with appropriate legal rights provides an effective mechanism for overcoming these difficulties. The SCOR Project will build on past experience of group economic activities - notably of the water user groups in major irrigation schemes - and promote group efforts in water and land use in the watersheds.

2.2 Failure to Consider Environmental Impacts

Sri Lanka has a long history of cultural sensitivity to the environment. Unfortunately, the combination of increased population pressure, the push for development and modernization, and inappropriate policies has seriously eroded this sensitivity. The impact of this loss, expressed in accelerated environmental degradation, is difficult to address in the agriculture sector, especially in the small-holder subsector. The typical processes used for environmental protection in the industrial sector -- establishment of environmental standards, monitoring of impacts, and enforcement of rules -- can be effective because most of the environmental-impacting practices can be identified with the individual producer. In the agriculture sector, particularly in farming, adverse impacts are usually the result of the **cumulative** effects of the actions of many, and cannot be identified with individuals against whom corrective actions can be taken. These problems, typically of a **non-point source**, cannot be effectively dealt with using the point source control mechanisms. These cumulative effects, such as erosion resulting from inappropriate cultivation practices, pesticide and nitrate contamination of groundwater and nitrate or phosphorous eutrophication of tanks and streams, are the result of decisions made in the normal course of farming. Unless those actors are informed by the knowledge of potential impact, and unless **profitable** alternatives exist for these cultivation practices and the management of those chemicals, environmentally inappropriate decisions will continue to be made (Levine, 1992).

Other environmental impacts may be the result of failure to use appropriate protection practices because they are technically too difficult or too expensive. Erosion control practices that require physical structures are illustrative. In this case, to reflect and protect public interest, and to encourage its adoption considerable technical assistance, training and new incentive structures may be necessary.

While most agricultural environmental impacts are from non-point sources, some, such as those resulting from inappropriate irrigation or accelerated erosion resulting from

inappropriate (or illegal) cutting of trees on fragile lands can be identified with individuals. In these cases, more often than not, penalties are proposed to generate corrective action. However, education, training and technical assistance, understanding of alternative use, **incentive structures**, reduction in pressures to utilize environmentally fragile lands **through participatory protection of natural resources** are usually much more effective in internalizing environmental considerations into agricultural decision making.

Customary economic incentives, such as product prices and market stability must also be such that production of resource appropriate crops can be profitable. Government policies on price fixing, property rights, importation of agricultural products, and other forms of regulation of agriculture and natural resources influence farmer decisions.

2.3 Inadequate Resource Information

To understand environmental cause and effect relationships, and to evaluate their physical, economic, and social impacts, information on the environment must be available at a scale that permits appropriate decision making. For this information to be available, data must be collected, processed, analyzed and made accessible in usable form by the decision makers and users. Unfortunately, there is a serious lack of this basic information, particularly at the level of detail necessary for agricultural and resource utilization planning. In addition, even the available data are not conveniently available to those who could best benefit from them.

To assist in the identification of potential opportunities, the information must encompass a wider range. Information on technology, infrastructure, water sources, population centers, marketing, etc., become important when attempting to discover new economic potentials.

Computer-based data handling systems are now available to quickly and efficiently manage spatially defined data, and to permit their combination according to different criteria. The resulting combinations can be displayed readily as maps, charts, tables, or other forms of dissemination. These Geographic Information Systems (GIS) are being adopted rapidly by planning agencies, private firms and others involved with natural resources management and utilization.

2.4 Institutional Constraints

Institutional constraints of special relevance to the objective of balancing production and protection would include:

a) inadequate institutional environment to foster new, sustainable production opportunities;

b) user groups nonexistent or too weak to participate in planning, management and control of natural resources;

c) resource tenure arrangements that inhibit adoption of sustainable production and conservation practices;

d) a lack of coordination among agencies, donors, projects, levels of government and resource users with respect to the use of natural resources;

e) a lack of supporting services for the identification and implementation of sustainable production and protection practices;

f) inadequate environmental consciousness with respect to potential impacts of agricultural and nonagricultural production decisions at various levels.

The SCOR strategies are directly aimed at reducing and/or removing these constraints.

2.4.2 Inadequate Co-ordination Between Projects/Activities

Many past efforts, with their emphasis on immediate gains and centralized, but poorly co-ordinated, have inadequately addressed the need to manage and utilize the natural resources that are the basis for continued production and development, more efficiently, effectively, and in a sustainable manner. Moreover, the number and variety of projects currently underway to improve the agricultural production sector, to rehabilitate and improve irrigation infrastructure, to enhance the capacity for appropriate planning and implementation of natural resources-based activities, and to increase awareness of environmental problems are such that the **potential for overlap, duplication**, and conflict, as well as for synergistic benefits exists. Effective communication and cooperation as well as co-ordination and integration of activities involving the management of natural resources are necessary to maximize benefits, to reduce costs and to avoid conflicts. (SCOR Project Paper 1992)

Local or **community control** of water and land resources in the watersheds should, therefore, enhance the efficiency of monitoring and imposing penalties.

3. SALIENT FEATURES OF THE SCOR APPROACH

3.1 Watershed-based

The focus on watersheds as basic planning, co-ordinating and implementation units is a unique feature of SCOR. The term watershed is defined as the area of land surface that drains water into a common point along a stream or river. (SCOR pilot watersheds are being sub divided into sub watersheds/basins for convenience.) The rationale for using the river basin watershed as the basic unit for integrated planning of (land and water) resources utilization is clear. The watershed is a physical entity geographically defined by an important natural resource, water; the ways in which the water in the upper parts of the watershed are used affect the ways in which it can be used downstream, and they affect the associated land resource.

Thus, the various parts of the watershed are physically and operationally linked in important ways, and the potential benefits from integrated use can be large. However, the people in the different components of the watershed having access to different aspects of the natural resources base, may be engaged in different economic activities, and may be of different social and/or cultural backgrounds. People in the upper catchment areas may have very different environmental, economic and social conditions from those in associated irrigated commands and those in downstream areas of the irrigated areas. Thus, the personal and economic interests in the different areas do not necessarily coincide, introducing problems for planning and implementation.

This implies that socio-economic and institutional factors, too, influence the linkages between "upstream and downstream". For example, the inter-relationships between **chena** (shifting/slash & burn cultivation) in the catchment areas of reservoirs in the watershed (mainly in the upstreams of watersheds) and paddy farming in the irrigated commands and drainage areas (downstream) are influenced by socio-economic factors. Similarly, there exist significant socio-economic relations among tanks systems within a "minor tank cascade"[3]. Such factors as land tenure, power structure, village institutions, community traditions, etc. can influence land and water use patterns within tank systems as well as within river basins/watersheds. As people are the final decision makers in regard to the use of land and water resources, they not only influence those linkages and relationships but also can change the production potential of land and water resources either favourably or adversely. (Sakthivadivel, Fernando & Wijayaratna 1994)

Thus, any development/conservation approach should consider those physical-socio-economic and initial linkages that exist between upstream and downstream of a river basin/watershed, between upstream and downstream of a river basin/watershed, between systems within watersheds (such as the variations within and between micro watersheds/basins like the tank cascade systems. See section 4 for illustrations). It should also consider the role of "users both in production and protection. **In other words, sustainable agricultural development in the broad context of rural development in these areas requires a watershed-based integrated approach which not only optimizes the production, but also ensures the protection of the natural resources or production base with active participation of the users concerned. Potential benefits from such an integrated participatory watershed management effort can be large.**

Moreover, the physical boundaries of the watershed are rarely congruent with the boundaries of the administrative or constituent political entities. This situation complicates the processes of planning and implementation.

In order to overcome these problems, the Project emphasizes an integrated participatory approach, and will make a substantial investment in linkage and coordination. Experience in the

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[3] The SCOR **Huruluwewa** watershed contains about 220 small tanks (in addition to the major reservoir). Most of these small tanks are in series of clusters or cascades.

major irrigated commands, in Sri Lanka, has shown that the combination of the use of catalysts, sharing of information, and reasonable administrative and political support can bring divergent groups into successful cooperative activity. While the process will be more difficult in the context of the full watershed, **there is a reasonable probability of success, and the potential for major benefit.**

3.2 User-oriented/participatory

The strategy is designed to be user-oriented and participatory. This means that much of the emphasis and activity of the Project will be at the field level in the selected watersheds. The approach will be to increase the **share of control of the natural resources of the watershed by the users and to support them as they attempt to intensify, expand or move into new economic activities. To achieve economies of scale, and to utilize group solidarity to promote responsible behavior, the Project is based upon group action as a primary vehicle for Project implementation.**

As constraints to group activities are identified, the Project will assist in the removal of the constraints. When the constraints are the result of policies, rules, regulations, or actions of a higher level, the Project will work at those levels to achieve the purposes of the Project. (see section 4 for policy level achievements) **Demand-driven changes** are likely to be more expeditiously addressed than recommendations for change from above. The Project structure, including Steering Committees in each of the provinces and at the national level will facilitate the process of inducing change.

The Project's participatory mode, starting with the design process, in which officials, resources user group representative and others from the national, provincial, district and divisional levels played important roles, through to implementation should facilitate both the identification of problems and constraints and their solutions.

3.3 Shared Control of Resources

SCOR aims at sustaining productivity of land and water resources within watersheds through shared control by local user groups and the government involving formal agreements and joint management. In the Sri Lankan situation, such a process should clearly increase the share of users' control over land and water resources.

SCOR makes a different interpretation of the property rights defining it in the context of individual and communal ownership of resources based on culture, local values and local market conditions. For example, instead of exclusive individual property rights (in this case a complete transfer of ownership of state land to individuals) concept of **shared control**, usufructuary rights, longer term lease arrangements, **state-user partnerships** are being tested in pilot watersheds. It is hypothesized that such alternatives to exclusive individual property rights may provide the Sri Lankan natural resources user a sense of ownership.

3.4 A Proper Mix of Technology, Organization and Resources, TOR

SCOR assumes that the "sense of ownership" is a necessary condition but not a sufficient condition for motivation to undertake sustainable practices. Therefore, the sense of ownership should be backed by **technology, organization and resources.** The project activities, classified under four themes, aimed at an appropriate mix of TOR:

i. Strengthening the Capabilities of Resources User Groups

a) Survey of Existing Local Organizations (in pilot areas)
b) Constraints Analysis (in pilot areas)
c) User Group Creation (in pilot areas)
d) Legal Status and Powers for User Groups including formal agreements between user groups and state
e) Skill Development and Training for User Groups and Trainers
f) Environmentally sound Economic Opportunities for User Groups
g) Appropriate technologies and techniques aimed at balancing production and protection: eg:conservation farming, water saving techniques, conjunctive use of water
h) Supporting Services and Facilities for User Groups
i) Establish Production Companies (for advanced user groups)

ii. Improving Land and Other Resources Tenure Arrangements

a) Regulatory and Legal Mechanisms
b) Resources Access and Tenurial Arrangements
c) Policy and Process Reform (long term)
d) Land Titling
e) Land Consolidation

iii. Strengthening Government, NGO and Private Sector Capacities to Support User Groups through Participatory Land and Water Management, Training and Skill Development

a) Information Systems
b) National Departments and Agencies
c) Provincial Councils and Staffs
d) Divisional Offices and Line Agency Staffs
e) Strengthening of NGOs
f) Strengthening of the Private Sector and Banks

iv. Improving Coordination and Linkage for Land and Water Resource Management

a) Coordination among Projects, Programs and Activities
b) Coordinate and Improve Provincial and Divisional Planning and Implementation
c) Coordinate the activities of different Government Agencies and Donors
d) Administrative and Coordination Mechanisms for Watersheds (in pilot areas)
e) Multi-Level Planning (in pilot areas)
f) User Group Federations in Watersheds (in pilot areas)
g) Establishment of Information System

3.5 Multi-level

While the Project will focus the majority of its activities at the local level, with the watershed as the basic unit, other activities will take place at the divisional, district, provincial and national levels. The specific activities at the intermediate levels will be determined in the process of dealing with the problems and constraints identified in the selected watershed. It is anticipated that these activities will be those that strengthen the ability of the government and others to more adequately provide supporting services to the user groups, and to assist in the reorientation of the government agencies to a client-centered mode.

At the National level, the primary emphasis will be on strengthening the capacity to deliver appropriate information on natural resources to the broad community that can benefit from that information. In addition, primarily based on the results of the Projects action-research activity, certain policy and process reforms will be promoted at this level.

3.6 Inter-Project/Activity Co-ordination

In the pilot watersheds, SCOR project will take the leadership in bringing the activities (projects, programs, etc.) based on land and water resources into closer co-ordination. The project will strengthen the capacity of the provincial and Divisional Secretariats in integrated planning for the utilization of land and water resources in the watersheds. The institutionalization of such an approach will shift the strategy of development of land and water resources (in the watersheds) from an uncoordinated "project mode" to a well co-ordinated "program mode".

4. SCOR IMPLEMENTATION

4.1 Organization

The project is being implemented primarily by the user groups with the help of catalysts, a multi-disciplinary team of IIMI professionals (comprised of conservation farming specialist, Agriculture/Agro forestry specialist, Institutional development specialists and Enterprise development/marketing specialists) stationed on-site, Watershed Resources Management Team (WRMT) chaired by the Divisional Secretary (i.e. Chief of government at divisional level) and comprised of IIMI professionals, concerned government officials (eg: Departments of

Agriculture, Irrigation, Forestry, Agrarian Services), representatives of user organizations. Representatives of NGOs and Organized Private sector firms will join the team as and when necessary. Provincial steering committees chaired by the Provincial Chief Secretaries and National Steering Committee chaired by the Secretary to the Ministry of Forestry and Irrigation and represented by relevant government bodies, WRMT etc. help recommend policy changes provide guidance, help resolve conflicts and monitor the progress of SCOR. (Figure 1). A rigorous Monitoring and Evaluation Program and a special research study program are also included in SCOR.

4.2 Participatory Planning of Production and Protection Processes

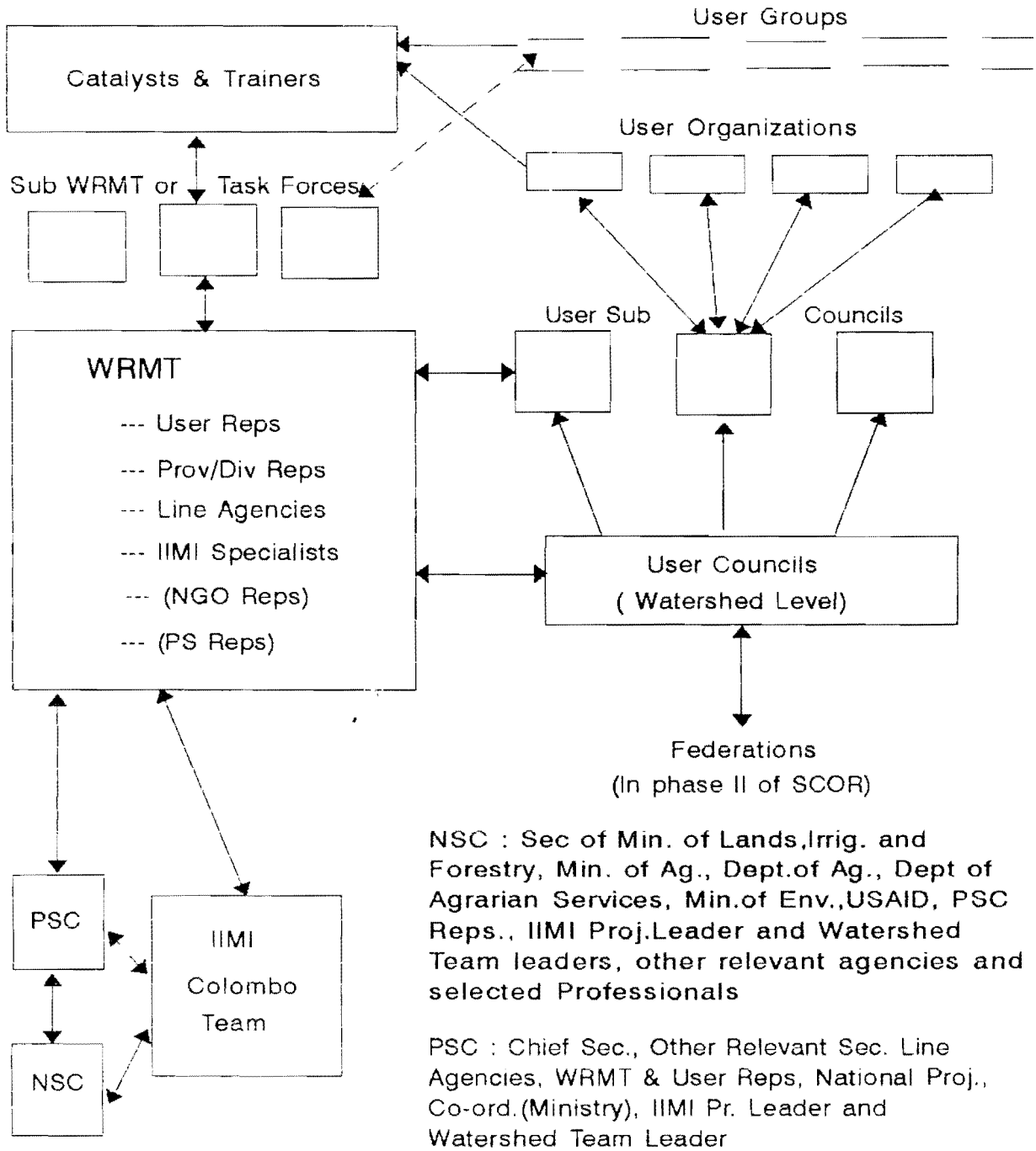
SCOR project launched its field activities in October 1993. The demarkation of boundaries in the two watersheds and land-use mapping using accepted land use categories and the latest land-use information available (i.e. 1989) was done by the Land Use Policy Planning Division of the Ministry of Lands (LUPPD). The LUPPD used 1:50,000 maps for this purpose. Next, **using these maps and in consultation with users and relevant officials** several sub water basins (within each watershed) were selected for SCOR interventions during the initial phase (1993-95).

The selected sub watersheds are contiguous areas of manageable size within the main watersheds, having characteristic profiles of ecological, socio-economic and environmental features similar to that of the respective main watersheds. Size of selected sub watersheds ranges from 200 ha to 1000 ha. Action is being taken to demonstrate an "ideal" land use pattern with due emphasis on production & protection. This "contiguous area" or "model watershed" approach of implementation would illustrate the various production - protection elements along with their intimate relationships, that will have to be incorporated in watershed management in order to produce a sustainable land and water resources base.

In the selected sub-watersheds, participatory appraisal of the characteristics of resource uses and users as well as **current** resource use mapping were done by a 'group' comprising of : IIMI-SCOR professionals/catalysts, relevant local officials *(such as Grama Niladhari, Colonization Officers, Agric. Instructor)* and farmer/user representatives. The catalysts took the lead role in preparing the "map" and recording of information. Other group members as well as the users helped the catalysts in the identification of land holdings, consultations with users and provide information. The groups were guided and supported by senior IIMI-SCOR professionals, Divisional Secretaries, Irrigation Engineers and technical officers, Divisional Officers of Agrarian Services, Senior Officials of Forest and Agriculture Departments, etc. General objectives of a typical participatory appraisals were to:

a. prepare a map of the sub watershed indicating individual **land holdings**, land use patterns, type and quality of vegetation, water use, drainage lines, irrigation methods etc.;

Figure 1 - SCOR Project Organizational Structure



NSC : Sec of Min. of Lands,Irrig. and Forestry, Min. of Ag., Dept.of Ag., Dept of Agrarian Services, Min.of Env.,USAID, PSC Reps., IIMI Proj.Leader and Watershed Team leaders, other relevant agencies and selected Professionals

PSC : Chief Sec., Other Relevant Sec. Line Agencies, WRMT & User Reps, National Proj., Co-ord.(Ministry), IIMI Pr. Leader and Watershed Team Leader

Legend :

WRMT - Watershed Resources Management Team
PSC - Provincial Streeing Committee
NSC - National Streeing Committee
PROV - Provincial
Div - Divisional
REPS - Representation
PS - Private Sector

b. develop a data base including some basic data such as : type and membership of user organizations, ownership and tenurial patterns, cropping patterns and intensities, apparent degree of soil erosion, conservation practices, production and productivity, constraints to production and protection;

c. help establish a baseline for the resource use pattern using (a) and (b); and

d. sensitize the officials of relevant government agencies/NGOs, and resource users on the importance and need for this exercise and to obtain their active participation in future work.

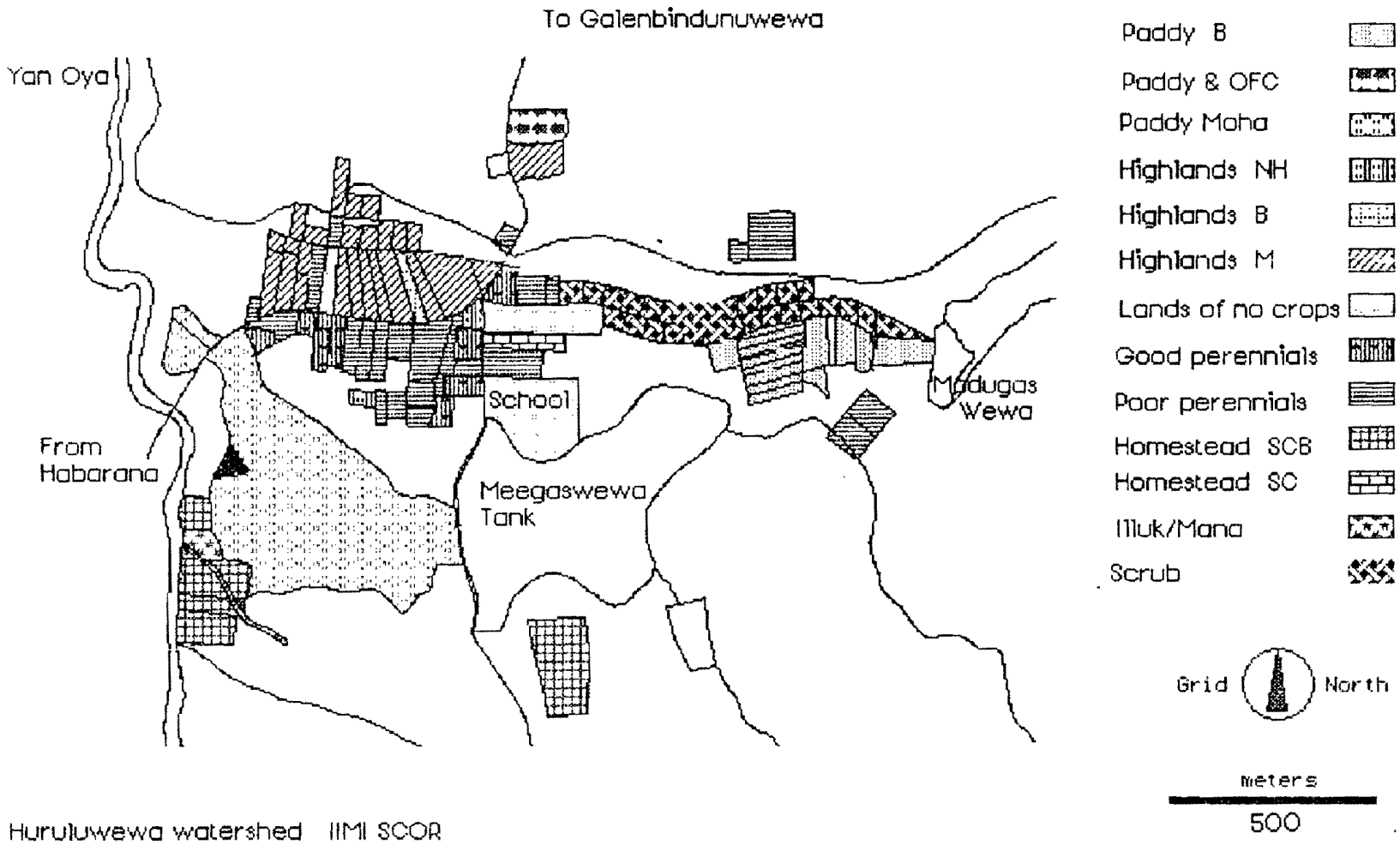
For this purpose, each group was provided with a map of 1:3000 scale with land marks indicating roads and streams for guidance. The group collected data and mapped each land plot of villages. Refining of the map to maintain accuracy to scale was done subsequently by the draughstman supporting the group and the **map was used for participatory planning of resources management of that village.**

The map was digitized and linked to the computerized data base using Geographic Information System (GIS). This was repeated for each village in selected sub water basins. For example, Figure 2 shows the current land use (as of January 1994) by individual plot of one such village. For this particular village, a participatory resources management "mini project" was formulated with an investment of Rs.1.2 million ($24,000). The project aims to change the present **land and water use pattern to a more profitable and diversified resource use combining production and conservation using appropriate technologies/techniques (ref. Section 3), novel shared control arrangements and resource augmentation.**

The planned future land use pattern is illustrated in Figure 3. Contour bunds and drains are being established covering the entire extent shown in this map as well as in several other pilot areas. Other activities include: planting Gliricidia sepium as hedgerows and growing seasonal cash crops and perennials between bunds in the uplands, increase soil moisture retention using mulch (both in uplands and paddy fields), homegarden development - especially by farm women, integrated pest management, organic farming etc. Novel modes of state-user partnerships in land and water resources use have been arranged. This mini project is backed up by SCOR with a sub-grant of approximately Rs.400,000/= (US$8000). The Banks have agreed to provide a loan 4 times larger than the SCOR grant for the user organization using the grant deposit as collateral. A Colombo based company offered a forward contract to the user organization to purchase a major portion of the expected exportable produce under the "mini project".

Figure 2

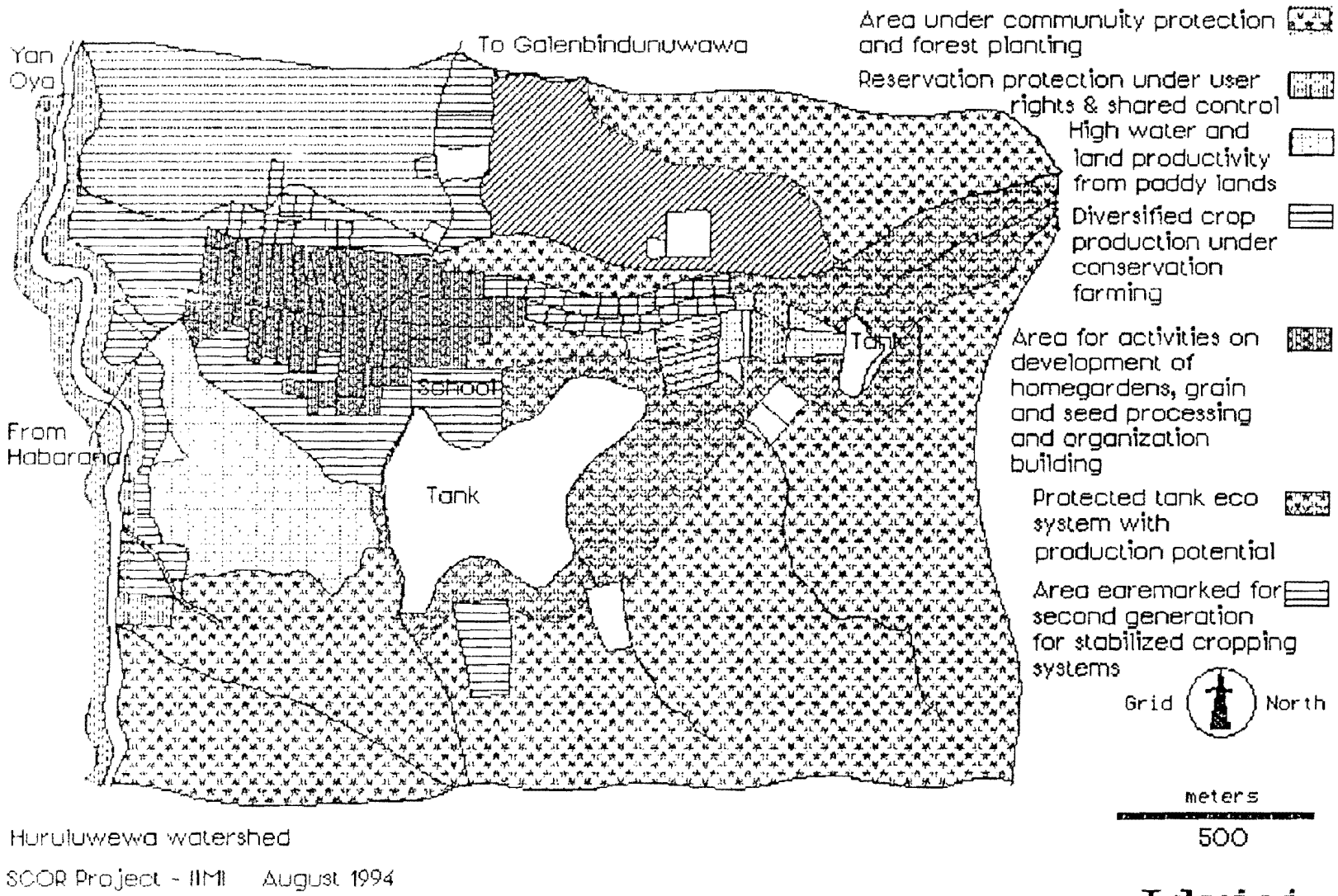
MAHAMEEGASWEWA LAND USE - JANUARY 1994



Huruluwewa watershed IIMI SCOR

Figure 3

PLANNED FUTURE LANDUSE FOR MAHAMEEGASWEWA



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